

Claims

1. The invention relates to a method for prequalification of subscriber access lines for broadband services with the following procedural steps:

- a time-discrete multicarrier transmit signal formed in accordance

$$\text{with } s(n) = \sum_{k=0}^M \sum_{l=0}^N c_{k,l} g(n - lN_T) \exp\left(j2\pi \frac{nk}{M_F}\right)$$

is applied to a test point of a subscriber access line,

- the echo pulse response $y(n)$ of the subscriber access line is measured at the test point,

- from the echo pulse response, second complex-valued random coefficients $d_{k,l}$ are determined according to

$$d_{k,l} = \sum_{n=(l-1)N_T}^{n=(l+1)N_T} y(n) \gamma(n - lN_T) \exp\left(-j2\pi \frac{nk}{M_F}\right),$$

- the empirical estimate of the cross-correlation function $\tilde{W}_h(p, q)$ of the signals formed from the indices $c_{k,l}$ and $d_{k,l}$ by two-dimensional discrete Fourier transformation

$$C_{m,n}^{(i)} = \sum_{m=0}^{N_T} \sum_{l=i}^{i+K-1} c_{k,l} \exp\left(-j2\pi \left(\frac{mk}{N_T} + \frac{nl}{K}\right)\right)$$

$$D_{m,n}^{(i)} = \sum_{m=0}^{N_T} \sum_{l=i}^{i+K-1} d_{k,l} \exp\left(-j2\pi \left(\frac{mk}{N_T} + \frac{nl}{K}\right)\right)$$

is determined according to

$$K_{m,k}^{(i+1)} = (1 - \lambda) K_{m,k}^{(i)} + \lambda C_{m+n,k}^{(i)} W_g(m+n, k) \overline{D_{m,n}^{(i)}} \overline{W_\gamma(m, k)}$$

(where $0 < \lambda < 1$ is a forgetting factor which must be selected according to the entire averaging length of the measurement depending on the computing accuracy of the processor used),

and similarly to the estimation of the cross-correlation function,
an estimation of the power density spectrum of any noise signals is
performed according to

$$5 \quad S_{noise, k}^{(i+1)} = (1 - \lambda) S_{noise, k}^{(i)} + \lambda |d_{i, k}|^2,$$

- the empirical estimate of the cross-correlation function $\tilde{W}_h(p, q)$
is compared with the stored values of measured reference lines

$T^{(k, m)}(p, q)$ and, from the comparison, the physical parameters of
the subscriber access line are determined.

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